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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/928,563	08/13/2001	Elliot Karl Kolodner	GB920000100US1	7167

7590 06/28/2004

IBM Corp.
Intellectual Property Law
Route 134/Kitchawan Road
Yorktown Heights, NY 10598

EXAMINER

LEROUX, ETIENNE PIERRE

ART UNIT	PAPER NUMBER
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2171

DATE MAILED: 06/28/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/928,563

Applicant(s)

KOLODNER ET AL.

Examiner

Etienne P LeRoux

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 6, 10-16, 18, 19, 23-29, 31, 32 and 36-39 is/are rejected.
- 7) ☒ Claim(s) 4, 7-9, 17, 20-22, 30 and 33-35 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 August 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. ____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

Claim Objections

Claims 4, 7-9, 17, 20-22, 30 and 33-35 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1, 2, 10, 12-15, 23, 25-28, 36, 38 and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by US Pat No 6,728,852 issued to Stoutamire (hereafter Stoutamire).

Claims 1, 14 and 27:

Stoutamire discloses:

- a garbage collector for operating across both heaps to remove objects that are no longer live [Figure 2A, col 4, lines 37-55, col 6, lines 27-38]
- a means for expanding the first heap into said unallocated region according to a first expansion policy [Fig 2A, 202]; and

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- a means for expanding the second heap into said unallocated region according to a second expansion policy [Fig 2A, 220].

Claims 2, 15 and 28:

Stoutamire discloses wherein said computer system supports a transaction processing environment, and said first heap is used for storing objects that are deleted at the end of the current transaction, and said second heap is used for storing objects that persist from one transaction to another [col 4, lines 45-54].

Claims 10, 23 and 36:

Stoutamire discloses wherein said garbage collector performs a compact operation after a garbage collection of the first and second heaps, said compact operation being performed in response to a first set of criteria relevant to the first heap, and a second set of criteria relevant to the second heap [col 5, line 65-col 6, line 3, col 5, lines 5-16, col 6, lines 27-38].

Claims 12, 25 and 38:

Stoutamire discloses means for shrinking the first and second heaps after compaction, and returning released storage to said unallocated region [col 4, lines 21-45].

Claims 13, 26 and 39:

Stoutamire discloses further including a bit array, having one bit for each possible object location in said portion of storage, said bit indicating whether or not there is an object currently stored at the corresponding object location [col 8, lines 35-42].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3, 5, 6, 16, 18, 19, 29, 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoutamire in view of US Pat No 6,453,404 issued to Bereznyi et al (hereafter Bereznyi).

Claims 3, 16 and 29:

Stoutamire discloses the elements of claims 1 and 2 as noted above.

Stoutamire fails to disclose wherein the first heap is reset to the same predetermined initial size at the start of each transaction.

Bereznyi discloses wherein the first heap is reset to the same predetermined initial size at the start of each transaction [col 46, lines 34-64].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Stoutamire to include wherein the first heap is reset to the same predetermined initial size at the start of each transaction as taught by Bereznyi.

The ordinarily skilled artisan would have been motivated to modify Stoutamire per the above for the purpose of providing memory defragmentation [Bereznyi, col 46, line 34].

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Claims 5, 18 and 31:

Stoutamire discloses the elements of claims 1-3 as noted above.

Stoutamire fails to disclose wherein a midpoint is defined halfway between the first heap and second heap, when they each have their initial size.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Stoutamire to include wherein a midpoint is defined halfway between the first heap and second heap, when they each have their initial size.

The ordinarily skilled artisan would have been motivated to modify Stoutamire per the above for the purpose of defining the relative sizes of the first heap and the second heap.

Claims 6, 19 and 32:

Stoutamire discloses the elements of claims 1-3 and 5 as noted above.

Stoutamire discloses wherein the first expansion policy is always to expand into said unallocated region in order to satisfy a storage request [col 4, lines 46-54]

Claims 11, 24 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Stoutamire in view of US Pat No 5,696,927 issued to MacDonald et al (hereafter MacDonald).
6,453,404

Claims 11, 24 and 37:

Stoutamire discloses the elements of claims 1 and 10 as noted above.

Stoutamire fails to disclose wherein said second set of criteria are more sensitive to fragmentation than the first set of criteria.

MacDonald discloses wherein said second set of criteria are more sensitive to fragmentation than the first set of criteria [col 12, lines 33-37].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Stoutamire to include wherein said second set of criteria are more sensitive to fragmentation than the first set of criteria.

The ordinarily skilled artisan would have been motivated to modify Stoutamire per the above for the purpose of removing unused data on the hard drive in order to consolidate data in contiguous memory sectors.

Allowable Subject Matter:

Claims 4, 17 and 30:

The computer system wherein the system returns an error condition if the second heap has expanded such that it is not possible to reset the first heap to its predetermined initial size.

Claims 7, 20 and 33:

The computer system wherein the rate of expansion of the first heap into the unallocated region is slower once the first heap has passed said midpoint.

Claims 8, 21 and 34

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The computer system wherein the second expansion policy is to expand into said unallocated region in order to satisfy a storage request until said midpoint is reached, whereupon said system preferentially performs a garbage collection to satisfy said request.

Claims 9, 22 and 35:

The computer system of claim 8, wherein the second expansion policy further includes trying to shrink the first heap to allow room to expand said second heap in order to satisfy a storage request.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

1) Hiroshi Koide: The Generated Order Preserving Real-Time Garbage Collection discloses two heap organization with real-time garbage collection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Etienne LeRoux whose telephone number is (703) 305-0620.

The examiner can normally be reached on Monday – Friday from 8:00 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic, can be reached on (703) 308-1436.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-3900.

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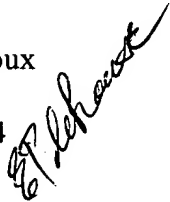
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Patent related correspondence can be forwarded via the following FAX number (703)

872-9306

Etienne LeRoux

June 24, 2004

A handwritten signature in black ink, appearing to read "Etienne LeRoux", written diagonally across the printed name and date.